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Research paper

Standardisation of different extracts of detoxified Nux-vomica seeds with its comparative study by TLC and HPTLC

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Abstract

Introduction

Detoxified Nux-vomica (detoxified *Strychnos nux-vomica Linn.*) is a very popular crude herb used in Unani and Ayurvedic pathy after detoxification for many years. The first person to identify Nux-vomica with the Indian drug kuchla was Haji Zainuddin. Detoxified Nux-vomica has significant effects on various disorders like rheumatic arthritis, inflammation, and gout (Anonyms, 2007;Bentley and Trimen, 1983). It has proved the best remedy for paralysis, nervous disorders, nervous debility, tremor, diarrhoea, and mental emotions (Nadkarni, 2000). The present study is designed to develop the qualitative as well as quantitative parameters of crudely detoxified Nux-vomica seeds and their comparative study by Thin layer chromatography (TLC) and High-performance thin layer chromatography (HPTLC).

Methods

Organoleptic characters, ash values, extractive values, phytochemicalanalysis, fluorescence analysis, TLC and HPTLC profiles, etc. were the parameters used for the standardisation of the test drug.

Results

Total ash values, water, alcohol, ether-soluble extractive values, and volatile oil percentages were found to be 1.925%, 6.54%, 3.25%, 3.20%, and 2.00%, respectively. The TLC profile of Detoxified Nux-vomica shows three spots for aqueous extract and five spots for hydroalcoholic extract in Toluene: Ethyl Acetate: Triethylamine (7:2:1) and four spots in Methanol: Ethyl Acetate: Triethylamine (0.5:8.5:1) with exposure in Dragendorff's Reagent. The percentage yield of strychnine in the hydro-alcoholic and aqueous extracts of Detoxified Nux-vomica is 7.48 and 2.10, while it is 6.17 and 1.85 for brucine, respectively.

Conclusion

The present study used secondary data for the identification and quantification of active constituents in detoxified Nux vomica seeds.

Introduction

Presently, the herbal field is growing very fast because herbal products have fewer side effects, either in medicine or cosmetics, but adulteration and spurious quality of the crude herb are major problems. Therefore, the quality and purity of herbs and their products are not assured because, due to the high trade, traders often mix spurious plants and their products for adulteration and substitution purposes (Bentley and Trimen, 1983). The potency and efficacy of any herbal drug mainly depend on the quantity and quality of their active constituents. Standardisation of herbal drugs aims to find out the quality and quantity of their active constituents; therefore, sound investigation of their quality as well as purity might be essential (Anonyms, 2007). Various parameters like macroscopic study, organoleptic study, fluorescence study, physicochemical analysis, phytochemical analysis, Thin layer chromatography (TLC), High-performance thin layer chromatography (HPTLC), etc. are used for standardisation of herbal drugs to find out their active chemical constituents (Nadkarni, 2000).

The seeds of Detoxified Nux-vomica are mainly adulterated and contaminated with inferior or superior-quality plant materials, that is, bhilawan and baladur (Rafiquddin, 1985). For this reason, the standardisation of Detoxified Nux-vomica (Detoxified *Strychnos nux-vomica* Linn.), family Loganiaceae**,** was performed on their various parameters along with their TLC and HPTLC profiles. Detoxified Nux-vomica is indigenous to east India and largely collected from forests in Sri Lanka, northern Australia, and India. It is found abundantly in south India, that is, in Tamil Nadu, Kerala, and on the Malabar Coast. It is also available in the forests of Bihar, Orissa, Mysore, and Gorakhpur (Anonyms, 1998). It is a very famous drug that is useful in many disorders like rheumatic fever, cholera, epilepsy, and incontinence of urine (Dey, 1975). Seminal debility, spermatorrhoea, constipation, weakness, dysentery, paralysis, diarrhoea, general exhaustion, lead poisoning, neuralgia, and aphonia (Choi et al., 2004) Anaemia, Paralysis, Colic, Leucoderma, Itching, Piles,

Ulcer, Jaundice, Urinary Discharges, Lumbago, Ring Worm, Weakness of limbs (Kirtikar and Basu, 1996). Nux vomica seeds contain 1.5–5% bitter Indole alkaloids. Highly poisonous, intensely bitter alkaloids strychnine and brucine, the seeds contain approximately 1.5% strychnine, and the blossoms contain 1.0%. While vomicine, α-colubrine, pseudo strychnine, and strychnine are also present. Apart from seeds, other parts of the plant contain the alkaloids N-methyl sec-pseudobrucine ($C_{24}H_{28}O_5N_2$), 1,5-hydroxystrychnine, 2-hydroxy-3-methoxystrychnine, N-oxystrychnine, Icajine, 3-methylicajine, protostrychnine, isostrychnine, and novacine (Evans, 2009). The bark contains brucine and traces of strychnine. The wood and root of the plant also contain strychnine. The other minor but chemically related alkaloids are isostrychnine, N-Oxystrychnine, protostrychnine, β-colubrine and novacine. Nux-vomica also contains a glycoside, viz., Loganin, chlorogenic acid, and fixed oil. The alkaloids can be isolated with the use of dilute sulphuric acid and lime. Strychnine sulphate is meagerly soluble in water and alcohol (Rastogi and Mehrotra, 1995).

Brucine and brucine N-oxide reduced the content of 5-hydroxytryptamine (50-HT) while increasing the content of 5-hydroxytriindole-3-acetic acid (5HIAA) accordingly. Although brucine and brucine N-oxide are similar in chemical structure, the central and peripheral mechanisms that are involved in pain modulation and anti-inflammatory effects are different (Yang et al., 2011).

Section snippets

Collection of sample

Dried seeds of detoxified Nux-vomica were purchased from DawakhanaTibbya College, Aligarh Muslim University, Aligarh, and were acknowledged by literature available in books and authenticated by Prof. Abdul Latif. The sample with specimen voucher no. SC-0228/17 was submitted to the museum of the Department of Saidla (Pharmacy), Ajmal Khan Tibbya College, Aligarh Muslim University, Aligarh, for future reference. (Fig. 1, Fig. 2)…

Detoxification of crude drug

Nux vomica seeds were soaked in water for seven nights; fresh water …

Results and discussion

The allopathic system of medicine depends on deep experimental data, toxicity studies, pharmacokinetics, pharmacodynamics, and human clinical studies. But there is a lack of pharmacopoeial standards for raw materials and finished products. Insufficient quality standards may cause mild to serious adverse effects. Hence, the standardisation of herbal drugs is a basic

requirement in order to establish identity, purity, and quality (Lutoti et al., 2020). Herbs are generally considered safe and are…

Conclusion

The good quality of the drug is an assurance of its efficacy and potency. The present study was aimed at developing methods of standardisation and identification of detoxified nux-vomica by various parameters, which were organoleptic characters along with physico-chemical parameters. Photochemical analysis, TLC, and HPTLC fingerprinting were used for the identification and authentication of detoxified Nux-vomica.

Further, these analytical parameters were used to determine the quantity of…

Ethics approval

All ethics are reserved.There is no animal study,no authors's conflict and no any human violation.…

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Author contributions

Dr. Syed Shariq Mian: Methodology, Validation, Investigation, Writing, Formal analysis. Md Irshad Alam: Conceptualisation, Resources. Prof. Najam Ali Khan: Supervision, Writing – review & editing. Mohd. Shuaib: Supervision and editing**,** Resources & review.…

Declaration of Competing Interest

The authors declare that there is no conflict of interest.…

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